

# ***THE SAN BERNARDINO MICROWAVE SOCIETY (SBMS)***

***“Communicating at 1 GHz and Above – Since 1955”***

## **October 2019 Updates, Activity and News**



### **Microwave Frequency Generation with Current Amateur Products**

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### **Upcoming October 2019 SBMS Meeting Technical Presentation:**

#### **Microwave Frequency Generation with Current Amateur Products**

Many of the traditional ways of generating / synthesizing microwave frequencies in communications systems are becoming obsolete as new technologies emerge and older component parts become difficult to obtain. This month, we will look at a few new products affordable to Amateurs with the stability and frequency accuracy for use in microwave systems. Dr. Doug Millar, K6JEY, recently drew the attention of SBMS to a small GPS disciplined reference oscillator. His email is re-printed below. A new generation of programmable PLL frequency sources such as the AD 5355 have emerged in the past few years, but many of these are not adequate for narrowband microwave radio use. SBMS members have found two of these with good enough noise performance to be considered.

After a brief introduction to these products, and comments from KM6RXN, SBMS members will contribute their knowledge and experience on these relatively new technologies. This will be an interactive discussion open to all attending members. Come to collaborate, share what you've learned, and gain new insights.

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## A Solution for EME Transceiver Stability Problems

Recently, SDR Kits has produced an amazing product. They have a very small GPS oscillator box that runs off of a cell phone power supply or battery. It has an internal GPS / GLONAS receiver that disciplines a wide range Digital Synthesizer. The oscillator can be locked to any frequency between 400Hz and 800MHz via software. The unit will retain the setting even with power off. There is another excellent feature. When the antenna is removed, the unit goes into “hold over” mode, thus retaining the acquired stability. It is easily interfaced with any oscillator, and when integrated to a radio’s TCXO stage, could solve the frequency stability problems encountered with many radios on digital modes such as JT-xx or FT8. **This product could also replace oscillators in most of our microwave radios and provide GPS level stability.** The phase noise specification is -144dBc at 1 kHz. I have found the best results by letting the GPS average for a while before I unplug the antenna. At \$100 it is an attractive deal. I feel this is a game changer for systems needing a frequency stability solution. Here is the link: SDRKits GPS

Dr. Doug Millar EdD - K6JEY



### GPS Disciplined Reference Oscillators

**Mini Low Jitter Precision GPSDO Reference Oscillator (1 Port)**

A new mini version of Leo Bodnar's popular low jitter GPS Clock - designed for Users with a limited budget or space restrictions, whilst still delivering accuracy and performance.

- Programmable Frequency 450Hz - 800MHz
- Stability 1 ppb 1E-9 <60 sec Locktime
- 1 SMA Output Connector
- Ideal for use with SDR Receivers



<http://www.sdr-kits.net/>

## digiLO - Wideband PLL Synthesizer

The digiLO is a wideband Fractional-N / Integer-N PLL Synthesizer capable of generating signals from 23.5MHz to 6GHz. Measuring only 2" x 3", it's primarily designed for use as a transverter's local oscillator. But it can also be used as a low-level signal source. It comes pre-programmed with over a hundred popular frequencies. Custom frequencies may also be available by special request. Connection to an external 10MHz reference is recommended. But the digiLO automatically switches to its on-board TCXO reference when its 10MHz external reference is not detected. A “LOCK” indicator for direct connection to a LED is also provided.



The Digi-LO is sold by Q5 Signal. There is some assembly required. Q5 Signal is the company that took over the “Down-East Microwave” 10 GHz transverter sales. A really good feature is that the factory will program custom frequency for you. The price is \$99.00 and comes with about 175 pre-programmed frequencies. The frequency is selected with an 8-position input using wire shorts or a DIP switch.

#### **The MKU LO 8-13 PLL from Kuhne / DB6NT**



The Kuhne Oscillator is more expensive than the others at US\$368.00 but it comes assembled, tested and with a proof-of-performance test data sheet. Features are:

- 54 MHz to 13.600 GHz
- Frequency freely configurable - using PC jumpers or software
  - Remote control
  - Intuitive operation
  - High Resolution
- Synchronisable also with other modules
  - 1 Hz accurate setting
- Can also be used as a stand-alone beacon



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## September Microwave Activity Report – 10 GHz and Up Contest September Recap

The Northern California microwave testers have established themselves as the current driving force in The ARRL Southwest Division. There were more “50 MHz and Up Club” microwave Ops on 10 GHz this year than the other clubs in Area 6. This is probably a reflection of all the high-tech companies in the SF Bay and San Jose areas that attract so much EE and electronics talent. My hat is off to the 50 MHz and Up Club for such a great showing in this year’s contest and for providing many QSOs for all the other testers.



**N9JIM**



**N6NU**

These Northern Cal. Operators have built some pretty sophisticated radios, many with 10G and 24G on the same reflector. Remember, AA6IW and AD6FP pioneered a 10 & 24 GHz integrated feed for this purpose and many of the 50 MHz and Up members have it. N9JIM (photo above) gave me my longest QSO this year and he did it with a fairly modest-sized reflector. That speaks to his operating skill and experience.



**N6JET & WA6QDP**



**K6TJ**

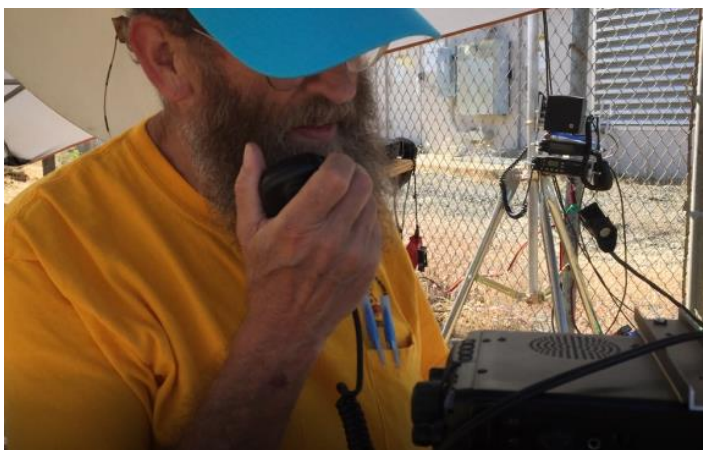


**WA6FSI**



**K6MG**

They operate from Mt. Diablo in the SF Bay area, Mt. Vaca northeast of Napa, and they rove with their portable radios in the California Central (San Joachin) Valley. Further to the north is Bald Mtn. chosen as an operating spot by K6MG in the photo below. I hear these operators lining up QSOs on Cactus late into the night. They are willing to do what it takes for a high score.



**N6KLD**



**K9RKH**

SBMS secretary, Courtney, N5BF had a great contest this year, scoring 53990 points by ARRL Cabrillo APP calculation and a best DX of 663 km. Ron – K6GZA, a long-time 50 MHz and Up Club member, provided access to Vaca for N5BF in September and operated his own 4-ft dish. Courtney said,

”My strategy this year was mountaintops only: Frazier, Vaca, and Diablo. Average QSO distance was 245 km. Which appears to work well and the views are great.”

His strategy resulted in excellent contest performance.





**N5BF & K6GZA – Mt. Vaca**



**N5BF – Diablo**

Note that Courtney made good choices in his QTH selections, availing himself of all the motivated microwave testers from Northern Cal. [AF6NA](#) – I joined K6QPV, K6NKC, AD7OI and KI7GVT on Mt. San Miguel in San Diego Saturday Sep. 21. With my upgraded 4-ft. / 30 Watt X-Band system, I made my longest QSO of 650 km from DM12mq to CM97kk.



**KI7GVT AD7OI**



**AF6NA**

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## September 2019 Technical Presentation

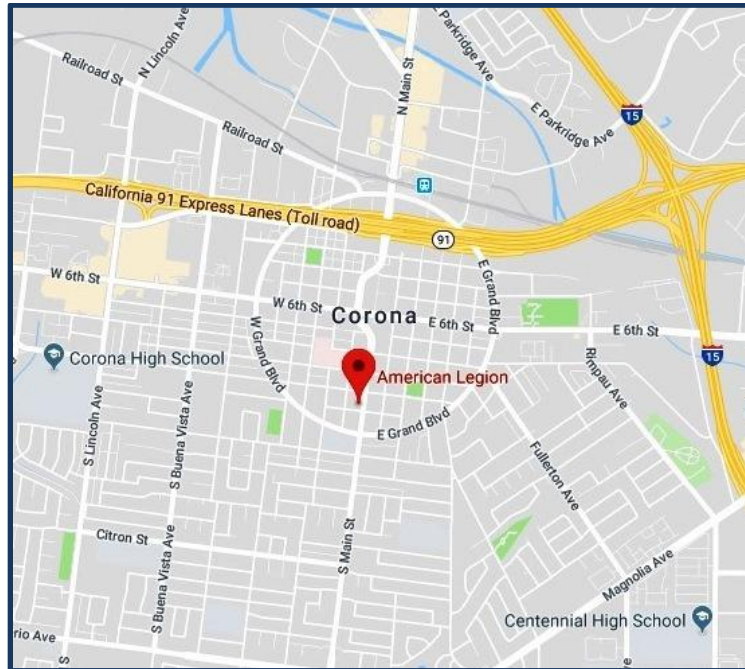
### **An Optical Frequency Single Sideband Modulator**

At the September SBMS meeting, Dr. Clark C. Guest Ph.D., Professor Emeritus of University of California San Diego (UCSD) spoke on patented single sideband modulation used in optical systems. Thanks to Robert, KM6RXN for booking Dr. Guest. His presentation was well-received and generated quite a bit of audience interaction and several follow-up questions.

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**SBMS Monthly Meetings:** First Thursday of the month – 7:00 PM

**American Legion Hall  
1024 South Main St.  
Corona, CA 92882**



**Contact SBMS:**

Feel free to get in touch with SBMS with questions about Amateur microwave systems, operation, design, club activities or meetings.

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Rein Smit:	W6SZ	rein0zn-at-ix.netcom.com	

**The SBMS E-Mail Reflector**

For hardware requests, technical help, microwave theory questions, reach all SBMS members on the email reflector list at the following address:

**sbms -at- ham-radio.com**

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## Amateur Microwave Beacons in California:

Radio Beacons are dependable signals always, on the air that builders and makers can tune in to and receive. They give the users an indication that their receiver is working, whether it is on frequency, and a rough idea of receiver sensitivity. The following beacons may be useful in microwave contests and system development.

### Northern California:

Name	Freq. MHz	Call	Altitude	Output	Grid Square	W Long.	N Lat.
Bear Mtn	24191.990	W6BY/B			DM06ir (IDs as DM07ic) CM88wj		
Mt Vaca	10368.325	W6ASL					
Mt. Leeson	10367.990	KF6KVG					
	24191.975						
	47087.990						
	79920.000						
Mt Allison	10369.000	K6MG					
	24192.010	N6NU					
	47088.000	KF6KVG					

### Los Angeles Area:

Name	Freq. MHz	Call	Altitude	Output	Grid Square	W Long.	N Lat.
Mt Frazier	10368.310	N6CA/B			DM04ms		
Heaps Peak	2304.325	W6IFE/B	6435 ft.	27 dBm (0.5W)	DM14kf	- 117.797	34.152
Santiago Peak	10368.330	AF6HP	5681 ft	33 dBm (2W)	DM13fr	- 117.534	33.711
Palos Verdes	10368.300	N6CA/B			DM03ts		

### San Diego Area:

Name	Freq. MHz	Call	Altitude	Output	Grid Square	W Long.	N Lat.
San Miguel	1296.297	K6QPV/B	2500 ft	40.8 dBm	DM12mq	- 116.935	32.569
San Miguel	3456.360	K6QPV/B	"	40 dBm	"	"	"
San Miguel	5760.000	K6QPV/B	"	33 dBm	"	"	"
San Miguel	10368.360	K6QPV/B	"	27 dBm	"	"	"

### Phoenix / Arizona:

Name	Freq. MHz	Call	Altitude	Output	Grid Square	W Long.	N Lat.
White Tanks	1296.270	W7ATN/B	3992 ft.	40 dBm (10W)	DM33rn	-112.560	33.560
White Tanks	10368.375 370	W7ATN/B	"	33 dBm	"	"	"

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## Events of Interest to the Amateur Microwave Community in 2019:

(Thanks to Marty Woll, N6VI for content) If you have other events or INFORMATION, email it to [brianaf6na-at-gmail.com](mailto:brianaf6na-at-gmail.com) or text it to 951-768-0960.

September 5	SBMS Meeting
September 14 – 16	ARRL September VHF Contest
September 21 – 22	ARRL 10 GHz & Up Contest – Part 2
September 29 – 30	ARRL EME Contest, 2.3 GHz & Up
October 3	SBMS Meeting
October 3 – 5	Microwave Update, Dallas, TX
October 5 – 6	Maker Faire, San Diego, CA
October 27 – 28	ARRL EME Contest, 50 to 1296 MHz. Part 1
November 7	SBMS Meeting
November 24 – 25	ARRL EME Contest, 50 to 1296 MHz. Part 2
December 5	SBMS Meeting